

WHAT IS CLAIMED IS:

1. A gas sensor element for measuring a concentration of a specified gas component contained in a target gas, said gas sensor
5 comprising:

a sensor portion having a solid electrolyte member and first and second electrodes, said solid electrolyte member having first and second surfaces opposite thereto, said first and second electrodes being mounted on the first and second surfaces of the solid electrolyte member,
10 respectively; and

a heater member having a heating element and one and other surfaces opposite thereto, said sensor portion being integrally laminated on the one surface of the heater member, said other surface of the heater member being contactable to the target gas,

15 wherein at least a part of said other surface of the heater member has a ten points average roughness, said ten points average roughness being no more than 1.71 μm .

2. A gas sensor element according to claim 1, wherein said at
20 least part of other surface of the heater member has an area, said area being no less than 90 percent of an all area of said other surface of the heater member.

3. A gas sensor element according to claim 1, further comprising:
25 a plurality of external surfaces including the other surface of the heater member, at least two of said external surfaces being contactable to

the target gas, each of said at least two of external surfaces having a ten points average roughness, said ten points average roughness of each of the at least two of external surfaces being no more than 1.71 μm .

5 4. A gas sensor element according to claim 1, wherein said other surface of the heater member is a polished surface.

5. A method of manufacturing a gas sensor element for measuring a concentration of a specified gas component contained in a
10 target gas, said method comprising:

preparing a sensor portion, said sensor portion comprising a solid electrolyte member and first and second electrodes, said solid electrolyte member having first and second surfaces opposite thereto, said first and second electrodes being mounted on the first and second surfaces of the
15 solid electrolyte member, respectively;

preparing a heater member having a heating element and one and other surfaces opposite thereto;

integrally laminating the sensor portion on the one surface of the heater member, said other surface of the heater member being
20 contactable to the target gas;

firing the integrally laminated sensor portion and heater member;
cooling the fired sensor portion and heater member; and

treating at least a part of the other surface of the heater member so that a ten points average roughness of the at least part of other surface
25 of the heater member is no more than 1.71 μm .

6. A method of manufacturing a gas sensor element according to claim 5, wherein said treating includes polishing the at least part of other surface of the heater member so that the ten points average roughness of the at least part of other surface of the heater member is no more than
5 1.71 μm .

7. A method of manufacturing a gas sensor element for measuring a concentration of a specified gas component contained in a target gas, said method comprising:

10 preparing a sensor portion, said sensor portion comprising a solid electrolyte member and first and second electrodes, said solid electrolyte member having first and second surfaces opposite thereto, said first and second electrodes being mounted on the first and second surfaces of the solid electrolyte member, respectively;

15 preparing a heater member having a heating element and one and other surfaces opposite thereto;

preparing a base member having a mount surface, at least a part of said mount surface having a ten points average roughness, said ten points average roughness of the at least part of the mount surface being
20 no more than approximately 8.55 μm ;

mounting the integrally laminated sensor portion and heater member on the mount surface of the base member so that the other surface of the heater member is contacted to the mount surface thereof;

firing the integrally laminated sensor portion and heater member
25 while the laminated sensor portion and heater member is mounted on the base member ;

cooling the fired sensor portion and heater member while the laminated sensor portion and heater member is mounted on the base member ; and

separating the sensor portion and heater from the base member.

5

8. A method of manufacturing a gas sensor element for measuring a concentration of a specified gas component contained in a target gas, said method comprising:

preparing a sensor portion, said sensor portion comprising a solid electrolyte member and first and second electrodes, said solid electrolyte member having first and second surfaces opposite thereto, said first and second electrodes being mounted on the first and second surfaces of the solid electrolyte member, respectively;

preparing a heater member having a heating element and one and other surfaces opposite thereto;

preparing a base member having a mount surface, at least part of said mount surface having a ten points average roughness, said ten points average roughness of the at least part of the mount surface being more than approximately 8.55 μm ;

mounting the integrally laminated sensor portion and heater member on the mount surface of the base member so that the other surface of the heater member is contacted to the mount surface thereof;

firing the integrally laminated sensor portion and heater member while the laminated sensor portion and heater member is mounted on the base member ;

cooling the fired sensor portion and heater member while the

laminated sensor portion and heater member is mounted on the base member ;

separating the sensor portion and heater from the base member;
and

- 5 polishing the at least part of other surface of the heater member so that the at least part of ten points average roughness of the other surface of the heater member is no more than $1.71 \mu\text{m}$.